

We claim:

1. A microfluidic device, comprising:

an inlet channel;

an at least one reaction channel engaged to the inlet channel wherein an enzyme is
5 located within the reaction channel; and

an at least one solid support in communication with the reaction channel capable of
concentrating a charged analyte produced by a reaction in the reaction channel.
2. The device of claim 1 wherein the solid support is a membrane.
3. The device of claim 2 wherein the membrane is an ultrafiltration membrane.
- 10 4. The device of claim 2 wherein the solid support is a nanocapillary array.
5. The device of claim 2 wherein the at least one membrane comprises a charge.
6. The device of claim 1 wherein the reaction channel comprises a first side channel and a
second side channel.
7. The device of claim 6 wherein the first side channel comprises a first charged membrane
15 and the second side channel comprises a second charged membrane.
8. The device of claim 7 where the first charged membrane comprises a positive charge and
the second charged membrane comprises a negative charge.
9. The device of claim 8 further comprising a negative electrode adjacent to the positive
charged membrane in the first side channel.
- 20 10. The device of claim 9 further comprising a positive electrode adjacent to the negatively
charged membrane in the second side channel.

11. The device of claim 1 further comprising an upstream separation module which delivers a substantially purified polypeptide to the microfluidic device.
12. The device of claim 1 further comprising a downstream separation module in communication with an outlet channel of the microfluidic device.
- 5 13. A microfluidic device, comprising:
- a first cover channel slide comprising an input channel and an output channel;
- a second cover channel side located beneath the first cover channel slide comprising a first channel aligned beneath the input channel and a second channel aligned beneath the output channel;
- 10 a nanocapillary array located between the first cover channel slide and the second channel cover slide; and
- a bottom slide located beneath the second channel cover slide.
14. The device of claim 13 wherein the inlet channel is in communication with an upstream separation module wherein the upstream separation module delivers a substantially
- 15 purified polypeptide to the microfluidic device.
15. The device of claim 13 wherein the outlet channel is in communication with a downstream separation module.
16. The device of claim 13 wherein a sample is concentrated at the nanocapillary array.
17. The device of claim 13 wherein the nanocapillary array is an ultrafiltration membrane.
- 20 18. The device of claim 13 wherein the microfluidic device comprises a protease.
19. A method of concentrating analytes, comprising:
- delivering a substantially purified polypeptide to a microfluidic device;

reacting a the substantially purified polypeptide with an enzyme within a reaction channel of the microfluidic device wherein a positive analyte and a negative analyte are produced;

concentrating the positive analyte at a first membrane;

concentrating the negative analyte at a second membrane; and

5 removing the concentrated analytes from the microfluidic device.

20. The method of claim 19 wherein the positive analyte is concentrated at a positively charged membrane.

21. The method of claim 19 wherein the negative analyte is concentrated at a negatively charged membrane.

10 22. The method of claim 19 further comprising engaging an upstream separation module to the microfluidic device wherein the upstream separation module produces the substantially purified polypeptide.

23. The method of claim 19 further comprising delivering the concentrated analyte to a downstream separation module after being removed from the microfluidic device.

15 24. The method of claim 19 further comprising utilizing electroosmotic flow to move the charged analytes.

25. The method of claim 19 further comprising providing a first side channel comprising a positively charged membrane.

20 26. The method of claim 25 further comprising positioning a negatively charged electrode adjacent to the positively charged membrane.

27. The method of claim 26 further comprising positioning a positively charged electrode adjacent to the negatively charged membrane.

28. A method of analyzing a substantially purified polypeptide, comprising:
- delivering a substantially purified polypeptide to a microfluidic device;
- delivering a first portion of the substantially purified polypeptide to a reaction chamber of the microfluidic device and delivering a second portion of the substantially purified polypeptide to a peptide analysis module;
- reacting the first portion of the substantially purified polypeptide with an agent wherein a reaction product is produced;
- delivering the reaction product to the peptide analysis module;
- perform a test on the second portion of the substantially purified polypeptide to obtain a first test result;
- perform the test on the reaction product to obtain a second test result; and
- compare the first test result with the second test result.
29. The method of claim 28 wherein the agent is an enzyme.
30. The method of claim 29 wherein the enzyme is a phosphatase.
31. The method of claim 29 wherein the enzyme is a protease.
32. The method of claim 28 wherein the agent is a derivatization agent.
33. The method of claim 29 wherein the enzyme is a cross-linking enzyme.
34. The method of claim 28 further comprising delivering an at least third portion of the substantially purified polypeptide to an at least second reaction channel.
35. The method of claim 28 further comprising providing an upstream separation module capable of producing the substantially purified polypeptide wherein the upstream

separation module delivers the substantially purified polypeptide to the microfluidic device.